

Remarks

Applicants respectfully request reconsideration of the present U.S. Patent application as amended herein. Claims 1, 12, 18 and 20 have been amended. Claims 32-37 have been added. No claims have been canceled. Thus, claims 1-37 are pending.

Claim Rejections - 35 U.S.C. § 102(b)

Claims 1-31 were rejected as being anticipated by U.S. Patent No. 5,666,461 issued to Igarashi, et al. (*Igarashi*). For at least the reasons set forth below, Applicants submit that claims 1-31 and new claims 32-37 are not anticipated by *Igarashi*.

Claim 1, as amended, recites the following:

receiving a stream of data comprising at least a predicted frame and a temporally closest anchor frame; and
utilizing even-parity field prediction to unidirectionally predict content of each of a plurality of fields of the predicted frame from corresponding fields of only the temporally closest anchor frame, wherein the predicted frame comprises a frame that is defined as a bi-directionally predicted frame according to an encoding protocol for the stream of data.

Thus, Applicants claim utilizing even-parity field prediction to *unidirectionally predict*, using a temporally closest anchor frame, the content of fields of a predicted frame. The unidirectional prediction is used for frames that would otherwise be encoded using bi-directional prediction.

Claim 12 recites a motion estimation circuit that utilizes even-parity field prediction to unidirectionally predict content of a predicted frame. Claim 18 recites a storage medium having executable instructions that cause a processor to perform even-parity field prediction to unidirectionally predict content of a predicted frame.

Use of unidirectional prediction rather than bi-directional prediction results in computational savings. See, for example, the Specification at page 19, lines 11-15. For example, using MPEG-2 encoding B-frames can be encoded using even-parity field prediction to unidirectionally predict fields using a temporally closest P-frame or I-frame.

Igarashi discloses bi-directional prediction. See B-frames in Figures 8, 9, 26 and the bi-directional components of Figures 27 and 29. Therefore, *Igarashi* does not disclose the invention as claimed in claims 1, 12 and 18.

Claims 2-11, 31, 32 and 33 depend from claim 1. Claims 13-17, 34 and 35 depend from claim 12. Claims 19, 36 and 37 depend from claim 18. Because dependent claims include the limitations of the claims from which they depend, Applicants submit that claims 2-11, 13-17, 19 and 31-37 are not anticipated by *Igarashi* for at least the reasons set forth above.

Claim 20 recites:

receiving a stream of data comprising reference frames and non-reference frames; and
predicting content of each of a plurality of fields in non-reference frames and select reference frames using information contained in merely corresponding fields of a single past or subsequent, temporally closest, reference frame, wherein the predicted non-reference frames comprise a frame that is defined as a bi-directionally predicted frame according to an encoding protocol for the stream of data.

Thus, Applicants claim prediction based on a single, temporally closest reference frame.

As discussed above, *Igarashi* does not disclose prediction using information contained in merely corresponding fields of a single, temporally closest, reference frame. Therefore, *Igarashi* does not anticipate the invention as claimed in claim 20.

Claims 21-30 depend from claim 20. Because dependent claims include the limitations of the claims from which they depend, Applicants submit that claims 21-30 are not anticipated by *Igarashi* for at least the reasons set forth above.

Claims 1, 18 and 20 were rejected as being anticipated by U.S. Patent No. 5,274,442 issued to Murakami, et al. (*Murakami*). For at least the reasons set forth below, Applicants submit that claims 1, 18 and 20 and new claims 32-37 are not anticipated by *Murakami*.

Claim 1, as amended, recites the following:

receiving a stream of data comprising at least a predicted frame and a temporally closest anchor frame; and
utilizing even-parity field prediction to unidirectionally predict content of each of a plurality of fields of the predicted frame from corresponding fields of only the temporally closest anchor frame, wherein the predicted frame comprises a frame that is defined as a bi-directionally predicted frame according to an encoding protocol for the stream of data.

Thus, Applicants claim utilizing even-parity field prediction to ***unidirectionally predict***, using a temporally closest anchor frame, the content of fields of a predicted frame. The unidirectional prediction is used for frames that would otherwise be encoded using bi-directional prediction. Claim 18 recites a storage medium having executable instructions that cause a processor to perform even-parity field prediction to unidirectionally predict content of a predicted frame.

Murakami discloses motion prediction based on even or odd fields. However, *Murakami* does not disclose unidirectional prediction based on a temporally closest anchor frame when the frame encoding protocol indicates bi-directional encoding. Therefore, *Murakami* does not anticipate the invention as claimed in claims 1 and 18.

Claim 20 recites:

receiving a stream of data comprising reference frames and non-reference frames; and
predicting content of each of a plurality of fields in non-reference frames and select reference frames using information contained in merely corresponding fields of a single past or subsequent, temporally closest, reference frame, wherein the predicted non-reference frames comprise a frame that is defined as a bi-directionally predicted frame according to an encoding protocol for the stream of data.

Thus, Applicants claim prediction based on a single, temporally closest reference frame.

As discussed above, *Murakami* does not disclose unidirectional prediction based on a temporally closest anchor frame when the frame encoding protocol indicates bi-directional encoding. Therefore, *Murakami* does not anticipate the invention as claimed in claim 20.

Claim Rejections - 35 U.S.C. § 103(a)

Claims 1-31 were rejected as being unpatentable over U.S. Patent No. 5,293,229 issued to Iu (*Iu*) in view of U.S. Patent No. 5,991,447 issued to Eifrig, et al. (*Eifrig*). For at least the reasons set forth below, Applicants submit that claims 1-31 and new claims 32-37 are not rendered obvious by any combination of *Iu* and *Eifrig*.

Claim 1, as amended, recites the following:

receiving a stream of data comprising at least a predicted frame and a temporally closest anchor frame; and
utilizing even-parity field prediction to unidirectionally predict content of each of a plurality of fields of the predicted frame from corresponding fields of only the temporally closest anchor frame, wherein the predicted frame comprises a frame that is defined as a bi-directionally predicted frame according to an encoding protocol for the stream of data.

Thus, Applicants claim utilizing even-parity field prediction to ***unidirectionally predict***, using a temporally closest anchor frame, the content of fields of a predicted frame. The

unidirectional prediction is used for frames that would otherwise be encoded using bi-directional prediction.

Claim 12 recites a motion estimation circuit that utilizes even-parity field prediction to unidirectionally predict content of a predicted frame. Claim 18 recites a storage medium having executable instructions that cause a processor to perform even-parity field prediction to unidirectionally predict content of a predicted frame.

Iu discloses MPEG encoding in which I-fields and P-fields are distributed according to various schemes. See Abstract. However, *Iu* does not teach or suggest unidirectional prediction for B-frames. Specifically, *Iu* discloses B-frame encoding according to the MPEG standards, which includes bi-directional prediction.

Eifrig bi-directional motion prediction for a current B-VOP. See Fig. 4. Therefore, nothing in *Eifrig* teaches or suggests unidirectional prediction for a frame for which bi-directional prediction would otherwise be used. Because neither *Iu* nor *Eifrig* teach or suggest unidirectional prediction as claimed in claims 1, 12 and 18.

Claims 2-11, 31, 32 and 33 depend from claim 1. Claims 13-17, 34 and 35 depend from claim 12. Claims 19, 36 and 37 depend from claim 18. Because dependent claims include the limitations of the claims from which they depend, Applicants submit that claims 2-11, 13-17, 19 and 31-37 are not rendered obvious by the combination of *Iu* and *Eifrig* for at least the reasons set forth above.

Claim 20 recites:

receiving a stream of data comprising reference frames and non-reference frames; and
predicting content of each of a plurality of fields in non-reference frames and select reference frames using information contained in merely corresponding fields of a single past or subsequent, temporally closest,

reference frame, wherein the predicted non-reference frames comprise a frame that is defined as a bi-directionally predicted frame according to an encoding protocol for the stream of data.

Thus, Applicants claim prediction based on a single, temporally closest reference frame.

As discussed above, no combination of *Iu* and *Eifrig* teaches or suggests unidirectional prediction for a frame for which bi-directional prediction would otherwise be used. Therefore, no combination of *Iu* and *Eifrig* can render the invention of claim 20 obvious.

Claims 21-30 depend from claim 20. Because dependent claims include the limitations of the claims from which they depend, Applicants submit that claims 21-30 are not rendered obvious by *Iu* and *Eifrig* for at least the reasons set forth above.

Conclusion

For at least the foregoing reasons, Applicants submit that the rejections have been overcome. Therefore, claims 1-37 are in condition for allowance and such action is earnestly solicited. The Examiner is respectfully requested to contact the undersigned by telephone if such contact would further the examination of the present application.


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Examiner Vo, Tung T.
TC/A.U. 2613

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